Managing Forests to Reduce Carbon Emissions

By Bruce Lippke

It is well recognized that forests provide a large inventory of stored carbon providing a strategic opportunity to increase carbon storage and reduce emissions. Avoiding deforestation and increasing reforestation are obvious strategies that have been advocated. But are they most important? The economics driving forest management is to produce products for markets and the carbon stored in wood products extends the carbon storage from the forest into buildings thereby avoiding carbon emissions to the atmosphere.

Carbon in our existing forests is essentially in a steady state with mortality and removals offsetting new growth. Conceptually, forest carbon for any given management strategy is emissions neutral, with the carbon removed from the atmosphere by photosynthesis offset by mortality or removals. It is the removals that provide the opportunity for transforming the solar energy driving photosynthesis into a storehouse of carbon. Looking out most windows you will generally see many buildings made of wood, steel and concrete before you see forests. The wood in buildings is a storehouse of carbon, an addition and extension to the carbon stored in the forest. On the other hand, the steel and concrete in buildings are fossil intensive in their production resulting in permanent carbon emissions to the atmosphere. Using wood instead offers the opportunity to use solar energy instead of fossil energy and reduce carbon emissions.

Looking only at the carbon in forests or even the carbon in forests and products is too limited a perspective to understand the importance of managing forests to reduce carbon emissions. We must understand, not just the role of forest carbon, but also the importance of carbon stored in products, and converting wood biomass to energy which substitutes for fossil energy just like wood products substitute for fossil intensive building materials.

A group of 15 research institutions known as the Consortium for Research on Renewable Industrial Materials (CORRIM) has been working for over a decade to fully understand the life cycle implications of using wood materials on all aspects of the environment, including air and water emissions, energy and global warming potential, solid waste, ecosystems, and material use efficiency. They have collected data on all the inputs and outputs for every stage of processing from forest regeneration, thinning and converting wood biomass to energy which substitutes for fossil energy just like wood products substitute for fossil intensive building materials. A group of 15 research institutions known as the Consortium for Research on Renewable Industrial Materials (CORRIM) has been working for over a decade to fully understand the life cycle implications of using wood materials on all aspects of the environment, including air and water emissions, energy and global warming potential, solid waste, ecosystems, and material use efficiency. They have collected data on all the inputs and outputs for every stage of processing from forest regeneration, thinning and manufacturing to the future use and disposal of the products.

Managing forests to reduce carbon emissions requires a systems approach that takes into consideration the full range of environmental impacts including air emissions, water pollution, energy use, solid waste, and waste disposal. This approach recognizes that forests are a storehouse of carbon, an addition and extension to the carbon stored in carbon sinks like the atmosphere. Using wood instead of fossil intensive materials offers the opportunity to use solar energy instead of fossil energy and reduce carbon emissions.

Learning how to capture these benefits is not easy. The pioneers that created our early green building standards did not understand life cycle concepts tilting the playing field away from using wood. Cap and trade emission systems that fail to measure the full systems impact of substituting wood for fossil intensive materials will likely be counterproductive. Builders and homebuyers make decisions based on limited insights further constrained by prices that do not reflect the costs of environmental burdens. Our public forests are managed as though doing nothing is free yet we know that the resulting increase in fires adds enormously to carbon emissions; increases the cost of fighting fires, destroys facilities, lives, water, and habitat; while also losing the opportunity to convert excess forest density into long lived products, biofuel and carbon storage.

The brave new world of science brings with it many complexities that must be sorted out. CORRIM was founded by 15 research institutions to do the research and develop the data to make better environmental decisions. The opportunity now exists for many more to participate and learn how to respond to the challenges of a complex world.

(For a detailed listing of CORRIM research, fact sheets, presentations and participation institutions see their web site for a wealth of good information at www.CORRIM.org)

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treatments, removals, producing building materials, transportation, construction, using and finally disposing of buildings through recycling and landfills (www.CORRIM.org). The database they have collected enables us to quantify all of the environmental impacts across the life cycle of many of the products we use in everyday life.

Using the CORRIM data we have been able to show that there are many opportunities to improve environmental performance, and especially to reduce carbon emissions, which result from the use of fossil fuels. Constructing buildings of different materials, using non-fossil energy sources, employing different designs, increased recycling, more intensive forest management, more efficient use of forest and wood residuals, and creating longer lived engineered products make up a long list of opportunities to substantially improve the environment while more effectively using the materials at our disposal. Managing forests for the highest growth and shortest rotation that can produce long-lived products has the most rapid impact in avoiding the use of fossil intensive products. The list of opportunities for improvement is long but the process of implementing change has barely begun.

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